STO NOMINATION FACT SHEET

SUBMITTAL DATE: March 2004

/SUBMITTING ORGANIZATION: Natick Soldier Center, RDECOM

STO NUMBER: NSC - 01

TITLE: Infantry Warrior Simulation (IWARS)

1. WHAT IS THE PROBLEM? Lack of a small unit Infantry model and required databases that are approved for Army studies. Types of analyses include thermobaric weapons effects, Army Materiel Systems Analysis Activity's (AMSAA) small arms analyses, TRADOC Analysis Center's (TRAC) Land Warrior Block II and III Analysis-Of-Alternatives (AoA's), and the Future Force Warrior's Essential Elements of Analysis (EEA's), etc..

2. WHAT ARE THE ROADBLOCKS TO SOLVING THIS PROBLEM? First, a robust, extensible intelligent agent architecture for small unit Infantry modeling is needed. Second, data to support algorithm development and model execution are needed. Third, the model needs to have intelligent, reactive agents with correct physiological and behavioral representation to address an operationally diverse set of battlefield functionalities. Fourth, terrain attribution needs to be simplified. Lastly, the model needs to operate intuitively for analysts.

3. HOW WILL YOU OVERCOME THOSE ROADBLOCKS? First, the Warrior Systems Modeling Technology STO will deliver a robust, extensible, intelligent agent model architecture at the conclusion of the STO (30 September 2004). Second, leverage AMSAA and the Human Research Engineering Directorate (HRED/ARL) to continue small unit data collection. Third, work with subject matter experts, e.g. AMSAA, USARIEM, HRED, NGIC, STTC, ARI, TRADOC, industry, etc. to develop appropriate friendly, neutrals and opposing forces (OPFOR) behavior sets. Fourth, look to leverage the gaming and/or mapping industry for simplifying terrain attribution. Fifth, involve analysts from the start in designing the model's user interfaces. Lastly, AMSAA, as a joint partner in the development of IWARS, will verify and validate (V&V) the model and databases, and certify IWARS for Army studies.

4. WHAT IS THE CAPABILITY YOU ARE DEVELOPING AND WHERE IS IT DESCRIBED? Improved warfighter survivability and combat effectiveness across the spectrum of infantry operations. The model will allow equipment designers to assess many more alternative concepts without the need for costly and timely prototyping.

5. IDENTIFY ALTERNATIVE APPROACHES/TECHNOLOGIES TO ACCOMPLISH/ENHANCE STO OBJECTIVE(S): There are currently three SBIR's that support the current STO and will transition to the new STO. The Phase II Army SBIR with SOAR Inc. is developing target engagement algorithms. Natick also supports an STTC SBIR with MAK Technologies. MAK and Natick will develop an Application Program Interface (API) to link MAK's Intelligent Robotic engine with Natick's IWARS model. Natick also has membership on the Soldier and MOUT Functional Area Collaborative Team (FACT) panels and participates in the C4ISR FACT. Two FACT

work efforts are in their second year of funding. Natick also has a Project Agreement with the Netherlands to jointly work on IWARS development.

6. WHAT IS/ARE THE PRODUCT(S) OF THIS STO? A certified, high level architecture (HLA) compliant Infantry simulation with V&V'd executable code and certified data for annual distribution to Army, USMC, and DoD, Program Managers and the Netherlands.

7. QUANTITATIVE METRIC: **Current Capability –** New Microsoft dot.com based architecture that supports the basic firefight. **Minimum Capability –** Complete move, shoot and communicate functionality with associated behaviors. **Goal** – model basics of the Warrior as part of the Networked Force.

8. WHAT IS THE WARFIGHTER PAYOFF? Improved warfighter survivability and combat effectiveness across the spectrum of infantry operations. The model will allow equipment designers to assess many more alternative concepts without the need for costly and timely prototyping. PM's can assess basis-of-issue and employment questions and their impact on the battlefield. The TRADOC Analysis Center will have a certified Army model for use in conducting their Analysis-Of-Alternatives (AOA) of major Soldier Systems. The Army Test & Evaluation Command (ATEC) will have use of the same model that was used to design the system.

The whole notion of a single model that can transition with a product from Concept Exploration through Procurement and Fielding is the essence of SMART. Scientists and PM's will be able to get better products to the Soldier both faster and cheaper.

9. TRANSITION MILESTONES: Versions of IWARS will be released each year as new functionalities are added. AMSAA will V&V each version prior to release. Model developers will work closely with TRAC's Land Warrior AoA Team and the Future Force Warrior's M&S Team to provide as many modeling capabilities as possible to meet their timelines. AMSAA will start using IWARS at the end of FY05 for technical trade analyses and small arms analyses. There is no cost for the model to government customers. No proprietary software has been imbedded in the model that requires purchase or licensing by a user. The model can be coded by any user familiar with Microsoft Dot.Net and COM .

10. TECHNOLOGY PROTECTION PLAN: In Process

11. MODELING AND SIMULATION: The model will provide autonomous, reactive agents with AMSAA /TRADOC verified and validated behavior sets. Physiological insults like heat stress, load encumbrance, weapons effects, etc. will also be incorporated. Terrain will come from Multigen Open Flight or CTDB-7. 3D graphics are provided by Net Immerse (now Gamebryo), a leader in the gaming industry. Certified databases and algorithms will be provided by AMSAA. Data inputs and outputs from IWARS will be stored in self described XML format. Data integrity can be maintained as XML provides a basis for author identification and versioning at the elemental level

12. INTERNATIONAL PROGRAMS: A Project Arrangement exists between the US and the Netherlands, specifically in support of IWARS. The Dutch have been using the IUSS in their Soldier Modernization Program and will switch over to IWARS as soon as it is available. The agreement calls for developing analytic methodologies and algorithms.

Natick also chairs the Joint Systems & Analysis Group's, Technical Panel 5, Dismounted Combatant Operations.

13. HOW ARE YOU LEVERAGING NON-ARMY FUNDING? The DoD Food RD&E Program funds development of a sub-model in IWARS that will address energy requirements and physical performance. Two OSD Phase II SBIR's support research into cognitive performance moderators and culturally specific aspects of human behavior. This work will ultimately find its way into IWARS.

14. LOGISTICS IMPLICATIONS: This STO has no substantial logistics implications.

15. HORIZONTAL TECHNOLOGY INTEGRATION (HTI): IWARS can provide high resolution small unit effects to Modeling Architecture for Technology, Research, and Experimentation (MATREX) and to higher echelon models such as the OneSAF Objective System and Combat XXI.

15. ENDORSEMENT: (Proposed) PEO SDR, Infantry School DCD, Director AMSAA, Future Force Warrior ATD PM, PM ICT, PM OneSAF.

16. DEFENSE TECHNOLOGY OBJECTIVE: